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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BAUER, SCOTT ALLEN

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/626,254		VERGNAT ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Scott Bauer		2836	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 January 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15 and 18-23 is/are rejected.
- 7) ☒ Claim(s) 14, 16 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings were received on 01/09/2006. These drawings are accepted.
2. Applicant's arguments, see the amendment, filed 1/9/2006, with respect to the rejection(s) of claim(s) 1, 18 & 19 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Howell (US 4,631,622).

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Howell (US 4,631,622).
5. With respect to Claim 1, Howell in Figure 1, discloses a device for protection against over-currents in an electrical energy distribution cabinet, which receives electrical energy supplied by at least one generator (47) and which distributes this

energy to at least two loads, the device comprises: switching means (12, 35 & 36), means for calculating (15, 25, 37 & 39) the absolute value of the difference between at least one current entering the cabinet and sum of the currents leaving the said cabinet to loads supplied by the generator, for at least one harmonic of these currents (column 3 lines 17-24), comparison means (17) which control the opening of the switching means (12) if this absolute value is greater than a predetermined threshold. This comparison between the current values would inherently require a predetermined threshold.

6. With respect to Claim 19, Howell discloses a device for protection against over currents as outlined in Claim 1, which would necessarily provide the method steps recited in Claim 19.

### **Claim Rejections - 35 USC § 103**

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-12, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howell (US 4,631,622), in view of Benmouyal et al. (US 6,757,146).

9. With respect to Claim 2, Howell teaches the invention set forth above and further teaches a means for measuring (19, 41 & 51) each of the different currents entering and leaving the cabinet. Howell further teaches that the current of the "other branch circuits can be summed and measured as well (column 4 lines 24-30).

Howell lacks performing the calculation on a harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Benmouyal et al. with Howell to perform a calculation on the current for at least one of its harmonics in a power distribution box, for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source.

10. With respect to Claim 3, Howell in view of Benmouyal et al. teaches the invention set forth above and further teaches that the calculating means determining the difference between the current coming from a generator (11) and entering the cabinet and the sum of the currents leaving this cabinet corresponding to the loads supplied by this generator. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

11. With respect to Claims 4 & 22, Howell teaches the invention and method set forth above and further teaches that the second calculating means (15, 25, 37 & 39) determining the difference between the set of currents entering the cabinet and the set of currents leaving the cabinet (column 3 lines 17-24). Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). In Column 2 lines 32-36 Howell teaches that the invention is used for three separate buses, one for each phase and the neutral line of the generator. Therefore, Howell teaches the limitation that the device determines the difference between the set of currents entering the cabinet and the set of the currents leaving the cabinet.

12. With respect to Claims 5 & 23, Howell teaches the invention and method set forth above. However, Howell lacks a device wherein the measurement of the value of the currents as well as the different calculations are performed cyclically, with a given sampling frequency. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

Benmouyal et al. also teaches sampling the signal at a selected sampling frequency and sending the result to an analog to digital converter (column 3 lines 27-29). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Howell with Benmouyal et al. by measuring the value of

the currents, as well as performing different calculations, cyclically, with a given sampling frequency.

This would be done for the purpose of converting an analog current signal into a digital signal, in order to apply various digital filters to the signal and to allow the use of a microprocessor to perform the calculations in order to detect current faults.

13. With regard to Claim 6, Howell in view of Benmouyal et al. discloses the device according to Claim 5 except that it does not disclose that the sampling frequency is greater than the fundamental frequency by a factor of 10 for the sampled current supplied by the generator.

However, it has been decided that, "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

14. With respect to Claim 7, Howell teaches the invention set forth above. However, Howell lacks a device wherein the control of the switching means is only tripped if a short circuit condition is verified during a number of sampling periods greater than a threshold.

Benmouyal et al. teaches a circuit with a timer that counts the number of sampling periods once a fault is detected. He further teaches that the circuit will not send a fault signal unless the fault is detected for at least two sampling periods. It

would have been obvious to one of ordinary skill in the art at the time the invention was made to add the timer of Benmouyal et al. to the differential current trip circuit (17) of Howell for the purpose of preventing a momentary spike in the current from being mistaken as a fault.

15. With respect to Claim 8, Howell in view of Benmouyal et al. teaches the device according to Claim 2. Howell further teaches that the current measurements are performed on each of the phases (column 2 lines 32-36).

16. With respect to Claim 9, Howell teaches the invention set forth above and further teaches a supply switch control unit wherein the switching means comprise at least one contactor.

17. With respect to Claim 10, Howell teaches the invention set forth above and further teaches a means for measuring each of the different currents entering and leaving the cabinet (Fig. 3 66-69). Howell lacks a calculation on the fundamental harmonic of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics including its fundamental harmonic, in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Howell and Benmouyal et al. in order to perform a calculation on the



fundamental harmonic of the current signal, for the purpose of detecting an over-current fault on a current source supplying a fixed frequency.

18. With respect to Claim 11, Howell teaches the invention set forth above. Howell lacks performing the calculation on the sum of the fundamental harmonic and of several lowest-order harmonics of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the harmonic filters (Fig. 2 20, 52, & 54) taught by Benmouyal et al. and to sum them together in the differential trip circuit (17) disclosed by Howell, for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source without requiring a large amount of processing power from a computer.

19. With respect to Claim 12, Howell teaches the invention set forth above. Howell lacks performing the calculation on one or more harmonics of selected order chosen from among the lowest orders of each of the currents. Benmouyal et al., in Figure 2 teaches a circuit which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Howell and Benmouyal et al. for the purpose of detecting an over-current

fault on any of the harmonics provided by a variable ac current source without requiring a large amount of processing power from a computer.

20. With respect to Claim 20, Howell teaches the method set forth above and further teaches a step of measuring each of the different currents entering and leaving the cabinet performed by 15, 17, 37 & 39 and a switching step performed by 12, 35 & 36.

Howell lacks a step of calculation on a harmonic of each of the currents.

Benmouyal et al., in Figure 2 teaches a method which divides an ac current into its various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Benmouyal et al. with Howell to provide a step of calculation on the current for at least one of its harmonics in a power distribution box, for the purpose of detecting an over-current fault on any of the harmonics provided by a variable ac current source.

21. With respect to Claim 21, Howell teaches the method set forth above and further teaches a calculating step to determine the difference between the current coming from a generator and entering the cabinet and the sum of the currents leaving this cabinet corresponding to the loads supplied by this generator.

Howell lacks a step of calculation on a harmonic of each of the currents.

Benmouyal et al., in Figure 2 teaches a method which divides an ac current into its

various harmonics in order to determine an over-current condition in a power system (Fig. 2 20, 52 & 54).

22. Claims 13, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howell (US 4,631,622) in view of Andersen (US 6282499).

23. With regard to Claims 13 & 15 Howell teaches the device according to Claim 1. Howell does not teach that the device contains acquisition modules for measuring current where there is a digital communications bus between the current measuring device and the calculation means.

Anderson, in Figure 1, teaches a device (30) for detecting trips where voltage and current sensors (32 & 36) measure current and an A/D converter (40), sends the digital data through a digital data bus (42), to a microcontroller (44) for calculations (column 2 lines 37-47). Anderson teaches that the sensors and A/D converter are separate elements from the microcontroller and so can be placed near the electrical connections as a module.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Howell with Andersen for the purpose of providing a current signal with greater noise immunity. This is because noise can be filtered out of a digital signal much better than an analog signal, and so any noise coupled into the system from the wiring can be reduced.

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24. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Howell (US 4,631,622).

25. With regard to Claim 18, Howell teaches the invention of claim 1 that can be used in the "electrical core" of an aircraft.

Howell does not teach the invention can be used in the electrical core of an aircraft. However the prior art structure is capable of performing the recited intended use and therefor meets the claim limitation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the invention in the electrical core of an aircraft for the purpose of providing low current protection for phase-to-phase or phase –to –neutral faults occurring between the upstream and downstream breakers of an aircraft's electrical core (column 1 line 68 & column2 lines 1 & 2).

#### ***Allowable Subject Matter***

26. Claims 14, 16 &17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

27. Claim 14 is allowable if rewritten in independent form because a controller area network bus has not been used to provide over-current protection between a data acquisition module and a calculating means in a vehicle electrical system. Alles et al.

(US 6525918) teaches a vehicle distributing system with a controller (22) that checks current conditions between a power supply and a load including over-current conditions (columns 3 lines 62-67& column 4 lines 1&2). Alles et al. further teaches that the controller sends a signal to the vehicles central computer via a CAN bus when a current fault has been detected. However, all calculations on the current are done prior to any signal being sent through the CAN bus and so does not anticipate the claim.

28. Claim 16 is allowable if rewritten in independent form because the relevant art does not teach a data acquisition module that includes a discrete Fourier transform (DFT) module. Andersen teaches that a data acquisition module contains an A/D converter, which inherently contains in succession; a low-pass filter, a sample-and-hold circuit, and a quantizing module. Anderson does not teach that the A/D converter contains a DFT module. Benmouyal et al. teaches a over-current detection system that contains digital filters which inherently contain a DFT module. However, this filtering takes place as part of a calculation system not in the data acquisition system.

29. Claim 17 is allowable if rewritten in independent form because the relevant art does not teach that the absolute value of the difference between the entering and leaving currents is temporally filtered in the calculating means. While Anderson teaches that current conditions can be sent to a calculating means via a digital bus. However, Anderson does not teach that the data is filtered temporally at the calculating means and so does not anticipate the claim.

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art found pertinent but not relied upon are included in form PTO-892 Notice of References Cited and include: Bowling (US 4,054,857) and Matsuoka et al. (US 5303156).

***Response to Arguments***

31. Applicant's arguments with respect to claims 1, 18 & 19 have been considered but are moot in view of the new ground(s) of rejection.

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


***Conclusion***

33. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Bauer whose telephone number is (571)272-5986. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571)272-2058. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAB  
01/03/2006



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